Differential Host Usage as a Premating Isolating Mechanism in Sympatric Species

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Reproductive isolating mechanisms can cause speciation. Though geographic isolation is common, sympatric isolation may also occur. This can happen when a subpopulation shifts to a new host plant, such as preferred fruits of fruit flies. In a study of true fruit flies, Feder and Bush (1989) determined differential host usage to be an important factor in isolating two sympatric species of *Ragoletis* (*R. pomonella* and *R. mendax*).

Ragoletis reproduce exclusively on their specific preferred host fruit. *R. pomonella* infest apple, while blueberry is the host for *R. mendax*. Both males and females identify their host-plant species through a variety of cues; mating occurs exclusively on or near the fruits. The females then lay their eggs in the fruits.

Though the original mechanism responsible for initiating speciation in this taxa is unknown, Feder and Bush determined *R. pomonella* and *R. mendax* can produce viable hybrids. Hybrid larvae can survive in either apple or blueberry. Adult hybrids produce viable and fertile offspring. These hybrids are genetically identifiable at six loci. Feder and Bush found no hybrid genotypes in larvae from dissected fruit.

This study shows differential host usage can maintain reproductive isolation between two sympatric species. While *R. pomonella* and *R. mendax* are capable of interbreeding, they do not do so even when their host plants occur in the same place. Host preference creates a premating isolating mechanism effective enough to prevent gene flow between potentially breeding populations.

Literature Cited

Feder, Jeffrey L. and Guy L. Bush. 1989. A field test of differential host-plant usage between two sibling species of *Ragoletis pomonella* fruit flies (Diptera: *Tephritidae*) and its consequences for sympatric models of speciation. *Evolution* 43(8):1813-1819.